

FORM PTO-1390 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTORNEY'S DOCKET NO. NL 000561
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		U.S. Application No. (if known, see 37 CFR 1.5) 09/857914
INTERNATIONAL APPLICATION NO. PCT/EP00/10280	INTERNATIONAL FILING DATE 10/13/00	PRIORITY DATE CLAIMED 10/14/99
TITLE OF INVENTION METHOD FOR ASSIGNING PROGRAM LOCATIONS IN A RECEIVER		
APPLICANT(S) FOR DO/EO/US MARNIX CLAUDIUS VLOT		
<p>Applicant(s) herewith submit to the United States Designated/Elected Office (DO/EO/US) the following items and other information:</p> <p>1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.</p> <p>2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.</p> <p>3. <input type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).</p> <p>4. <input type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.</p> <p>5. <input type="checkbox"/> copy of the International Application as filed (35 U.S.C. 371 (c)(2))</p> <p style="margin-left: 20px;">a. <input type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau).</p> <p style="margin-left: 20px;">b. <input type="checkbox"/> has been transmitted by the International Bureau.</p> <p style="margin-left: 20px;">c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US).</p> <p>6. <input checked="" type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2))</p> <p>7. <input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))</p> <p style="margin-left: 20px;">a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau).</p> <p style="margin-left: 20px;">b. <input type="checkbox"/> have been transmitted by the International Bureau.</p> <p style="margin-left: 20px;">c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.</p> <p style="margin-left: 20px;">d. <input type="checkbox"/> have not been made and will not be made.</p> <p>8. <input type="checkbox"/> A translation of the amendment to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).</p> <p>9. <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).</p> <p>10. <input type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</p> <p>Items 11. to 16. below concern document(s) or information included:</p> <p>11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98.</p> <p>12. <input checked="" type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 C.F.R. 3.28 and 3.31 is included.</p> <p>13. <input type="checkbox"/> A FIRST preliminary amendment.</p> <p style="margin-left: 20px;"><input type="checkbox"/> A SECOND OR SUBSEQUENT preliminary amendment.</p> <p>14. <input type="checkbox"/> A substitute specification.</p> <p>15. <input checked="" type="checkbox"/> A change of power of attorney and/or address letter.</p> <p>16. <input checked="" type="checkbox"/> Other items or information:</p> <p style="margin-left: 20px;"><u>3</u> Sheets of Drawings</p> <p style="margin-left: 20px;"><u>X</u> Authorization Pursuant to 37 CFR § 1.136(a)(3) and to Charge Deposit Account</p>		

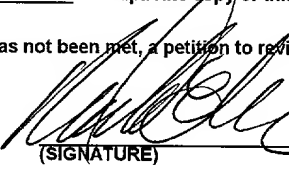
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Jeanne Rusciano
 Typed Name

Jeanne Rusciano
 Signature

U.S. APPLICATION NO. (If known) (37 C.F.R. 1.5) 097857914		INTERNATIONAL APPLICATION NO. PCT/EP00/10280		ATTORNEY'S DOCKET NUMBER NL 000561	
17 [X] The following fees are submitted: BASIC NATIONAL FEE (37 C.F.R. 1.492(A)(1)-(5)):				CALCULATIONS (PTO USE ONLY)	
Search Report has been prepared by the EPO or JPO				\$860.00	
International preliminary-examination fee paid to USPTO (37 C.F.R. 1.482)				\$690.00	
No international preliminary examination fee paid to USPTO (37 C.F.R. 1.482) but international search fee paid to USPTO (37 C.F.R. 1.445(a)(2))				\$750.00	
Neither international preliminary examination fee (37 C.F.R. 1.482) nor international search fee (37 C.F.R. 1.445(a)(2)) paid to USPTO				\$970.00	
International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4)				\$ 96.00	
ENTER APPROPRIATE BASIC FEE AMOUNT =				\$ 860.00	
Surcharge of \$130.00 for furnishing the oath or declaration later than [] 20 [] 30 months from the earliest claimed priority date (37 C.F.R. 1.492(e)).				\$	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total Claims	20 - 20 =		X \$ 18.00	\$	
Independent claims	2 - 3 =		X \$ 80.00	\$	
MULTIPLE DEPENDENT CLAIMS (if applicable)			+ \$270.00	\$ 270.00	
TOTAL OF ABOVE CALCULATIONS =				\$ 1130.00	
Reductions by 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 C.F.R. 1.9, 1.27, 1.28)				\$	
SUBTOTAL =				\$ 1130.00	
Processing fee of \$130.00 for furnishing the English translation later than [] 20 [] 30 months from the earliest claimed priority date (37 C.F.R. 1.492(f)).				\$	
TOTAL NATIONAL FEE =				\$ 1130.00	
Fee for recording the enclosed assignment (37 C.F.R. 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 C.F.R. 3.28, 3.31). \$40.00 per property				\$ 40.00	
TOTAL FEES ENCLOSED =				\$ 1170.00	
				Amount to be refunded	\$
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<p>a. [] A check in the amount \$ _____ to cover the above fees is enclosed.</p> <p>b. [X] Please charge my Deposit Account No. <u>14-1270</u> in the amount of \$ <u>1170.00</u> to cover the above fees. A duplicate copy of this sheet is enclosed.</p> <p>c. [X] The Commissioner is hereby authorized to charge any additional fee, with the exception of the Base Issue Fee, which may be required, or credit any overpayment to Deposit Account No. <u>14-1270</u>. A duplicate copy of this sheet is enclosed.</p> <p>NOTE: Where an appropriate time limit under 37 C.F.R. 1.494 or 1.495 has not been met, a petition to revive (37 C.F.R. 1.137(a) or (b)) must be filed and granted to restore the application to pending status.</p> <p>SEND ALL CORRESPONDENCE TO:</p> <p>Corporate Patent Counsel Philips Electronics North America Corporation 580 White Plains Road Tarrytown, NY 10591</p> <p style="text-align: right;">  (SIGNATURE) Michael E. Marion (NAME) 32,266 (REGISTRATION NUMBER) </p>					

The present invention relates to a method for assigning program locations in a receiver, preferably a digital receiver for terrestrial signals, to individual received broadcast signals where the broadcast signals originate from various transmitters, and to a receiver for such signals.

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Most modern analogue television receivers, such as TV sets, video recorders, satellite receivers or the like have a plurality of preprogrammable numbered program locations to which a specific receiving channel may be assigned. That is to say, the particular settings of the tuner in the receiver necessary to receive a service on a specific channel are stored in the receiver and will be used if the program location is selected, eg. by selecting on the remote control or directly on the set the number corresponding to that program location. Once specific channels have been assigned to desired program locations this allows the user to easily tune the receiver to a specific receiving channel simply by selecting the appropriate program location by pressing buttons on his remote control. In order to make this as convenient as possible the user will usually try to fill up the program locations in such a manner that the most viewed services are assigned the lowest numbers because this allows him to select the service by pressing one single button. Less watched services may then be assigned to program locations with less convenient numbers such as two or more digit numbers.

20

If he has more than one receiver, eg. several TV sets around the house or a video recorder connected to a TV set he would for obvious reasons desire to have the same services assigned to the same program locations on all his receivers, in order to remember at which program location a specific service is to be found.

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This aspect becomes increasingly important with the advent of digital terrestrial broadcasting, in particular of television, allowing up to five times as many services to be transmitted as compared to the traditional analogue television broadcasting.

As there is some inconsistency between the terms used in analogue and digital systems it should be noted that in the above as well as the following distinction is made between program locations, networks, channels, and services.

5 A service is understood as transmissions with a specific content from a service provider, such as the nation wide service of a public service television provider.

A network is in digital broadcasting understood as one or more transmitters transmitting a consistent package of services. Ie. this may be several transmitters distributed over a country all transmitting all the services of a nation public service provider or transmitting all the services of a commercial service provider. It may also be one single local
10 transmitter transmitting a single service to a local area.

Traditionally in analogue radio and television systems a channel is understood as the predetermined frequency band or bands allocated to the transmission of a signal carrying a service in order not to disturb other signals carrying the same or different services. This understanding, however, is insufficient when it comes to modern digital transmission
15 systems where the signals from several services may be transmitted on the same frequency using multiplexing techniques. Accordingly the term channel in the following description does not refer to the actual frequency or physical channel but rather to a multiplexed channel.

Program locations are understood as the preprogrammable locations to which tuning data allowing reception of a specific service are allocated, eg. the number under which
20 these data are stored.

It is well known that many people find the programming of their receivers difficult or at least cumbersome. Some people find the programming so difficult or even impossible that they have to rely on the help of others.

This is independent of whether it is the initial programming of the receiver in
25 accordance with the channels in which services may be received at the site of the receiver, or be it reprogramming of the receiver if the receiver is moved to another site or if changes in the channels where services may be received occur.

Such changes could be the removal of a service. The channel in which this service was received would then be vacant, ie. no service transmitted in that channel at all, or,
30 as is often the case in systems where the number of actual channels are limited, be used for transmission of a different service. If such a change occurs the user suddenly finds a gap or a new service at a given program location in the receiver. It is likely that he might not desire to have such a gap or this new service at that specific location. Accordingly he would have to go through cumbersome reprogramming of his receiver. If he has more than one receiver eg.

several TV sets around the house or a video recorder connected to a TV set the reprogramming becomes increasingly complicated because he would for the above obvious reasons desire to have the same services assigned to the same program locations on all his receivers.

5 As mentioned earlier this aspect becomes increasingly important with the increased number of services which will eventually be available in digital terrestrial broadcasting, and steps have been taken towards facilitating the assignment of channels to program locations in digital receiver for terrestrial broadcasts.

10 In existing digital broadcasting systems such as DVB all transmissions are supposed to be tagged with identification information identifying both the country (`original_network_id`) and the network (`network_id`) from which the service originates as well as an information (`service_id`) identifying the actual service transmitted. In order to achieve a consistent
15 allocation of services to programme locations in the a receiver information about a preferred programme location (`logical_channel_number`) is transmitted. Such a system is eg. described in the document: Digital TV Group, "Digital Terrestrial Television, Requirements for Interoperability", version 3.01, October 7, 1998. Available from DTG, Liss Mill, Hants, GU33 7BD, United Kingdom.

20 The `logical_channel_number` are allocated on a by-country basis based on mutual agreement among the different service providers. Accordingly in one country the `logical_channel_numbers` are allocated uniquely according to this agreement. Thus, services with the same `original_network_id` and `service_id` have the same `logical_channel_number`.

 Accordingly, when a receiver is first initialised it allocates all services that
25 may be received at a given location to these predetermined programme locations. The receiver will then ideally contain all the services that it may receive allocated according to the same scheme independent of where in the country it is situated.

 Though this system may work well for one country taken alone problems arise when services can be received from neighbouring countries, because these services are likely
30 to have `logical_channel_numbers` conflicting with the ones used in the country where the receiver is situated. Likely because the service providers within every country are likely to agree on `logical_channel_numbers` starting from one and using as many as necessary.

 Until now it has been up to the user to resolve such conflicts. The consistent allocation of services to programme locations is thus jeopardized because each individual

user would resolve these conflicts in a different way. Moreover it would be cumbersome and a nuisance to the user to have to manually resolve these conflicts, typically using a remote control and menus displayed by the receiver.

Moreover if a service is removed or replaced with a different service it has
5 been up to the user to fill the gap or rearrange the services, respectively.

It is an object of the present invention to provide a method for the automatic allocation of services that overcomes these drawbacks.

10 According to the invention this object is in a method according to the opening paragraph achieved by providing the broadcast signals with information about at least the country of origin, the transmitting network, a unique service identification and a logical channel number and by assigning in the receiver a program location to the received broadcast
15 signal in accordance with assignment rules based on the received information about the country of origin, about the transmitting network, the unique service identification and the logical channel number.

In one embodiment of the invention a service, corresponding to a received broadcast signal and identified by the unique service identifier, is given a country preference by primarily assigning it to the program location in the program location list corresponding to
20 the logical channel number and in case of conflict of logical channel numbers giving preference to any broadcast signal containing information of country of origin corresponding to a predetermined indication of country preference.

This overcomes the problem of resolving the conflicts between logical channel numbers transmitted from different countries. In particular this may be done in a consistent
25 manner independently of the user.

According to an advantageous aspect of the invention any service not given country preference is placed in a group of services having consecutive program location numbers in the list of program location numbers, the program location numbers being different from the respective logical channel numbers of the services.

30 This allows foreign services to be arranged in groups of services. The services will get higher numbers in the list of program locations. Accordingly these foreign services, which are per se considered of less interest to the user, will not take up the low program locating numbers, in particular one-digit numbers, which are easy for the user to press on his remote control.

In an embodiment of this aspect services with the same country of origin are arranged together in subgroups within said group of services not given country preference.

This allows services from neighbouring countries arranged country by country. It will then be easier for the user to remember where services from countries with
5 languages that he understands are to be found in the program location list.

In a preferred embodiment preference is given to the signal with the highest signal strength is in case of conflict of logical channel numbers and country of origin.

This generally allows the regional service of the user to be placed at a convenient place in the list of program locations.

10 In an alternative embodiment preference is in case of conflict of logical channel numbers and country of origin given to any broadcast signal containing information of network of origin corresponding to a predetermined indication of network preference.

This allows for the receiver to positively place the preferred regional service at the most convenient location in the program location list. It does however involve that
15 information of geographic location of the receiver, is input, preferably by the user.

In a further preferred embodiment any service not given regional preference is placed in a group of services having continuous program location numbers in the list of program location numbers, the program location numbers being different from respective logical channel numbers of the services.

20 This allows all the regional services, except the preferred one, to be easily found in the program location list because they are all in one group, the location of which easier for the user to remember.

In a further preferred embodiment the group of services given neither country preference nor regional preference are placed in subgroups of groups of services with the same country of
25 origin.

This allows foreign regional services to be arranged as a subgroup within the respective groups of services from foreign countries.

In another preferred embodiment of the invention a map of which logical channel numbers are allocated to which program locations is stored.

30 This may be used to keep track of which logical channel number transmitted by the transmitter from which the signal is received is allocated to which program location. This allows the association between the program location and the logical channel number to be re-established later, eg. in case of a changed reception situation, a reconfiguration of

services transmitted on the network or networks of transmitters, or in case of a temporarily wrongly transmitted service information confusing the receiver.

Further it is preferred that a map of which transmitting network were previously associated with which program locations is stored.

5 This information may then be used to give priority to the previously stored network when trying to allocate several alternative new services to this program location.

Also, according to the invention this object is in a receiver according to the opening paragraph achieved by the receiver comprising means for extracting information about the country of origin of the signal, the transmitting network, a unique service
10 identification and a logical channel number,

and means for assigning the received signal to a program location in accordance with the extracted information and a set of assignment rules stored in the receiver.

This allows a user to program or reprogram his receiver at different
15 geographic locations thereby maintaining a high degree of consistency in the assignment of services to given program locations. That is to say, to the extent that the services available correspond, the user will automatically find the same services at the same program locations on his receiver after reprogramming thereof.

Moreover the system allows nation-wide consistency between receivers as to
20 the assignment of services to program locations, provided of course that a specific service is available. That is to say, where ever the user goes he is likely to find a given service of interest on arbitrary receiver. That is to say, not only within his own household but also other receivers such as receivers at friends or neighbours residences or in public places such as clubs, pubs or hospitals etc.

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The invention will now be exemplified in sets of rules and described in greater detail based on the figure on which,

fig. 1 is one half of a flowchart describing common parts of two embodiments
30 of the invention,

fig. 2a is the second half of the flowchart of fig. 1 describing one embodiment of the invention,

fig. 2a is the second half of the flowchart of fig. 1 describing a second embodiment of the invention,

fig. 3 is a schematic representation of a receiver implementing the invention.

5 In existing digital broadcasting systems such as DVB all transmissions are supposed to be tagged with identification information identifying both the country (original_network_id) and the network (network_id) from which the service originates as well as an information (service_id) identifying the actual service transmitted. In order to achieve a consistent allocation of services to programme locations in the receiver information about a preferred programme location (logical_channel_number) is transmitted.

10 The logical_channel_number are allocated on a by-country basis based on mutual agreement among the different service providers. Preferably this is done in conjunction with the appropriate co-ordinating authorities. Accordingly in one country the logical_channel_numbers are allocated uniquely according to this agreement. Thus, services with the same original_network_id and service_id have the same logical_channel_number.

15 These logical_channel_numbers are used directly in the receiver as identification of the program location to which a service should be allocated.

Accordingly the broadcasters should comply with the following rules.

To ensure that the resulting allocation of all services that may be received at a given location is easy to remember and without gaps, the logical_channel_numbers
20 preferably have no more than two digits, though three-digit numbers could under certain circumstances be necessary. Preferably the logical_channel_numbers are allocated starting with 01. Often it would be natural to allocate the number 01 to the oldest service from a national public service provider, because it typically has this number in its name. 02 for the second service of the same national public service provider etc. Other services such as
25 commercial broadcasters could have higher numbers, eg. also relating to a number present in their name.

Within the scope of one network logical_channel_numbers should be allocated uniquely. Services with the same original_network_id/service_id shall have the same logical_channel_number. When defining regional variants of the same service the same
30 logical_channel_number can be used. Eg. in neighbouring networks. This facilitates the definition of a consistent and compact numbering scheme taking into account the national/regional/local channel numbering. Further it indicates to the receiver that services with the same logical_channel_number are similar, eg. regional variants.

The receiver could resolve conflicts between regional variants by using the signal strength.

Based on the rules outlined above for the broadcasters manufacturers of receivers, such as television sets, set-top boxes, video recorders etc. may include the automatic channel numbering features in their receivers. For the automatic channel numbering according to this invention to be properly implemented by the manufacturer, however, a set of receiver rules has to be complied with.

When a receiver service list is first initialised, that is to say scans through all the possible channels trying to receive signals on these, the receiver shall allocate the services according to the following rules.

I1) It shall attempt to allocated the services to a program location in a programme location list corresponding to the logical_channel_number for that service. Thus if there is only one service with a particular logical_channel_number this service shall be allocated to this program location in the list.

However there are basically two kinds of conflicts between identical logical_channel_numbers. One is the national, where networks in different countries transmit the same logical_channel_numbers. The other is when two different national networks transmit the same service.

I2) Accordingly the receiver shall resolve any conflict between services that use the same logical_channel_number.

National preference is preferably given to services with the same preferred original_network_id , since the original_network_id is effectively a country code this ensures that the services primarily allocated to program locations in the receiver are all from the user's country. Provided of course that this country code is set in the receiver. Preferably the conflicting services with foreign original_network_id's which have lower priority are arranged together in groups, preferably in one or more groups in the program location list in which all services have the same original_network_id. Within these groups the services with the lowest logical_channel_numbers should be allocated the lowest program location numbers in the program location list.

If desired, the arrangement of the groups of services with foreign original_network_id's could be in accordance with the manufacturer's knowledge about which languages used in foreign, and in particular neighbouring countries, the user is most likely to understand.

Preference is secondarily given to regional versions of the same service.

Typically such regional versions transmit the same overall features such as film, entertaining and national news, but have time slots with different features such as local or regional news. Since all networks are to broadcast non-conflicting numbers these can be used to resolve such conflicts, because the services will be transmitted from different networks. This, resolution may eg. be based on a preferred network specified by the user, or based on the signal strength of received services. Ie. that service among several with same logical_channel_number and original_network_id having the strongest signal strength is considered to be the regional.

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10 I3) As to the other services with the same logical_channel_number and original_network_id they should preferably arranged in groups in the program location list. These groups may have an allocation in the program allocation list independently of original_network_id or as subgroups of groups of services having the same original_network_id. If some preferred ordering is agreed upon it is recommended to preserve this information.

15 I4) If a service, as it may sometimes be the case, does not have an associated logical_channel_number it shall if it has an original_network_id be placed after the respective groups of services allocated to program locations under I1) or I2).

I5) If a service does not have an original_network_id it should be placed at the bottom of the list, ie. allocated a position having a higher number in the list of program locations than any other service identified thus far during the initialising.

20 Using these rules the receiver will give an easy and generally consistent allocation of services in the list of program locations. The degree of consistency between receivers from different manufacturers will moreover depend on the degree to which they can agree to the schemes uses for the grouping and subgrouping under I2).

25 The above rules I1 to I5 are implemented in a receiver as depicted schematically in fig. 3 and described in more detail further below. The flowchart depicted on fig. 1 in combination with fig. 2a and 2b, respectively, shows an example of the steps that a receiver goes through when initializing. The flowcharts depicted in fig. 1 in combination with the respective figs. 2a and 2b are alternatives. Thus, both of these flow chart show the steps that a receiver may through when initializing.

30 As will be seen the two alternatives only distinguishes themselves by the steps 109a and 109b, respectively. All other steps are identical.

Reference is first made to fig. 1. The initializing process carried out by the receiver starts in 100. Eg. the first time the receiver is switched on, or by the user selecting

initializing or reinitializing option in a menu. It is assumed that at this stage the program location list stored in an internal non-volatile memory of the receiver is empty.

The receiver then starts scanning the available channels for services in step 101 until it finds a service. This service is then referred to as new until the time it has been assigned to program location in the program location list.

If it finds a new service the receiver checks the `logical_channel_nr` contained in the signal in the step 103. If the program location having the same number in the program location list as the `logical_channel_nr` is free the new service found the receiver proceeds to step 104 in either one of figs. 2a and 2b and assigns the service to channel.

It then continues the scanning in step 101 until it finds another new service. This cycle is repeated as long as the receiver finds new services with `logical_channel_nr`'s matching free program locations in the program location list, or possibly until the receiver has scanned all available channels. In that case the receiver does not find any new services and ends the initializing the step 112.

If the receiver finds a new service matching a program location already occupied the answer to step 103 is no, and the receiver proceeds to step 105.

In step 105 the receiver checks whether the `original_network_id` contained in the signal is equal to a predetermined country preference stored in the receiver. This country preference stored in the receiver is preferably set by the manufacturer prior to shipment to a specific country, but may of course also be changed manually by the user.

If the `original_network_id` is different from the country preference the, service is identified as foreign and is in step 106 placed in a group of foreign services. The receiver then continues the scan for new services in step 101.

In step 105 the receiver may, however, find that the `original_network_id` is identical to the preferred country.

The receiver then in step 107 checks the `original_network_id` of the existing service in the program location list.

If the `original_network_id` of the new service is not identical to the country preference stored in the receiver, the receiver moves the existing service to an appropriate group of foreign services in step 108. After having moved the existing service the receiver proceeds to step 104 in fig. 2a or 2b and places the new service at the location in the program location list corresponding to its `logical_channel_nr`.

If the existing service is not a foreign service it has an `original_network_id` corresponding to the country preference stored in the receiver. Accordingly the answer in step 107 is yes and the receiver proceeds to step 109a on fig. 2A or to 109b on fig. 2B.

5 In step 109a the receiver checks which of the signals of the existing and the new service, respectively, have the higher signal strength. The one with the higher signal strength is considered the more local, and thus to be the regional variant of interest. Thus if the new service does not have higher signal strength than the one already in the program location list, the new service is considered of less interest. The receiver then, in step 110 places the new service in a group together with other regional variants of the same service. It
10 should be noted that such a group may of course contain one service only.

After having allocated the new service a place in the program location list, the receiver continues the scan in step 101.

If, however, the receiver finds in step 109a that the new service has a higher signal strength it proceeds to step 111 where it moves the existing service in the program
15 location list to a location in a group of regional variants. Like the groups of foreign services such a group may also consist of one service only.

After having moved the existing service to a new location in the program location list, it allocates, in step 104, the new service to the program location number corresponding to the `logical_channel_nr` of the service, and continues the scan in step 101.

20 An alternative to the use of the signal strength as the criterion for identifying the most local service is to use the `network_id` contained in the signal. In this alternative the receiver contains at least a stored predetermined regional preference. In step 109b in fig. 2b the `network_id`'s of the existing and the new service are compared to the predetermined regional preference. If the new service is not preferred it is placed in the group of regional
25 variants in step 110 and the scan continued in step 101.

If on the other hand the new service is preferred over the existing one the existing service is as already described in moved to the group of regional variants in step 111, the new service a allocated to the program location corresponding to its
logical_channel_number and the scan continued in step 101.

30 If during the initializing scan the receiver finds an unidentified service. That is to say if the signal does not contain the identifiers it should, that service is placed below all other found services in the program location list. Preferably this takes place in a step (not shown) between steps 102 and 103.

It is evident that not all users would want their receiver to dictate an allocation scheme. Eg. the user may want to group together services according to topics. Eg. a group of services mainly featuring sports, a group of services mainly featuring music, a group of serviced directed mainly towards children etc. Accordingly the receiver according to the invention allows the user should be able to do so. Also, the receiver according to the invention allows the user to reinitialize the channel list, eg. if he moves permanently to a different country out of reach of the services originally received.

If changes are less drastic, eg. if one or more existing networks are reconfigured by addition or deletion of services, by a service being moved to another network, or if a whole new network with new services is introduced, the allocation of services to program locations in the receiver may also be changed.

In case of reconfiguring of existing networks the receiver must obey the following rules.

C1) When the receiver detects a change in the services offered, including the addition and deletion of multiple services, it shall first remove all services that can positively be determined as being permanently removed. Not until then shall it try to add new services.

C2) Having removed deleted services it shall attempt to find suitable replacement services for the services removed previously under C1).

C3) In the attempt to find suitable replacement services the receiver should try to find successor services for the ones removed having the same combinations of logical_channel_number, network_id and original_network_id as the ones previously removed from the program location list.

C4) The receiver should replace services of other networks no longer available with remaining new services. That is to say match only logical_channel_number and original_network_id. In this replacement the receiver should comply with rule I1) of the initializing procedure in order to select the most suitable replacement service.

If the receiver detects a new service to be added to the program location list it shall obey the following rule.

A1) The receiver should first try to allocate a program location according to the replacement service rules C3 and C4.

A2) The receiver should try to allocate the new service according to its logical_channel_number.

A3) In case of a conflict the receiver should try to allocate the service to a free program location.

By applying the replacement rules C1) to C4) and the addition rules A1) to A3) it is ensured that new services get an allocation in the program location list corresponding in the highest possible degree to what the user was used to before the changes and thus expects to find. If the user accordingly finds that the new service has been added to the end of the program location list, but rather wants it somewhere else, he is of course free to move it manually or even reinitialize the receiver.

Finally if a service is to be removed from the program location list the receiver deletes the service visibly from the list, but preserves the information about logical_channel_number original_network_id, network_id and service_id of the removed service. This information can then subsequently be used the next time changes take place and the replacement rules C1) to C4) or addition rules A1) to A3) are to be applied.

If, after the application of the above rules in the receiver any new services remain unallocated the receiver should allocate these according to the general allocation rules I1) to I5) used in the initializing of the receiver. It should however not change existing allocations, as this would be in conflict with the user's interest in always finding the services where he expects them to be.

If, however, empty program locations exist there are two possibilities, depending on preference. One is to always leave the gap open for a possible replacement according to the above replacement and addition rules. The alternative is to fill these gaps with new services, thus blocking future replacement of a deleted service with a service according to the rules. Thus the interests of the user in not having gaps in the program location list has to be weighed against the possibility of a intentional temporary removal of a service leading to it being moved to another program location because its location has been taken. In the interest of consistency between receivers from different manufacturers this should be decided and agreed upon among them.

As mentioned above fig. 3 schematically depicts an exemplary embodiment of a receiver 200 capable of implementing the method of the invention.

The receiver 200 receives an input 201 in the form of a television signal. In the illustrated embodiment the input signal 201 is received via an antenna, but could in principle just as well be received via a cable network or a satellite dish.

A tuner and decoding means 202 detects and converts the received input 201 to digital signals in the present case representing sound and video of a television signal. The signal could, however, be any kind of digital signal eg. representing a computer program or an internet homepage.

The digital signals representing sound and video of a television signal is in the output circuitry 207 converted to a output signal in the form of a television signal . That is to say a signal which may be used by eg. a conventional analogue television receiver. The invention is however not restricted thereto in the sense that the receiver may be an integral part of a digital television or a video recorder, though which the television signal is then output.

The tuner and control means 202 is controlled by means of a control unit 203. Preferably this control unit comprise a microprocessor performing various functions, inter alia the initializing and the update of the program location list stored in a non-volatile memory 204. The receiver 200 preferably further comprise a non-volatile memory 205 storing data about country and regional preferences. Though the memory 205 storing data about country and regional preferences for illustration purposes is displayed separate from the memory 204 storing the program location list, they may very well be one and the same physical memory chip.

The control unit 203 may be controlled by the user via a user input 209 and a user interface 206. The user interface on one hand receives input commands from the user, eg. issued via his remote control, and on the other hand it interactively responds to the users commands by displaying corresponding menus on via the output circuitry 207. These menus eg. being displayed on a television set connected to the receiver 200.

Using his remote control the user may issue commands to the control unit via the user input such as a command for initialization of the receiver. Upon such command the control unit clears the program location list in the memory 204. It the controls the tuner and decoder means to scans through all the available channels according to the procedure described in relation to figs. 1 and 2a or 1 and 2b. If the procedure according to figs. 1 and 2b is used the preferences stored in the memory 205 are used. If the user desires he may also via the user input and the control unit 203 change the preferences, in particular he may do so before effecting the initializing. After initializing he may still via the user input 209 and the control unit 203 manually alter the contents in the program location list in the memory 204. He may also effect the control unit 203 to carry out scans for changes, additions and deletion in the services that may be received. The control unit then updating the program location list according to the rules A1) - A3) or C1) - C4) described earlier.

The key issues of the system described above provides are considered to be.

The system automatically assigning services to the programme location list of a receiver in view of the country and regional preferences of the user.

The country discrimination between services is done by effecting the receiver to use information in the broadcasts to discriminate between broadcasts from different countries by means of the original_network_id foreseen to be transmitted in terrestrial DVB systems.

- 5 The regional discrimination is done by effecting the receiver to use information in the broadcasts to discriminate between broadcasts from different networks by means of the network_id foreseen to be transmitted in terrestrial DVB systems.

- 10 The method keeps the list of program locations as constant as possible in situations of changing network configurations, changing location of the receiver or changing reception conditions. This is done by remembering previous services and looking for replacements for these. This also makes the system robust against any form of accidental removal of a service as long as such an error is restored timely.

CLAIMS:

1. Method for assigning program locations in a receiver to individual received broadcast signals where the broadcast signals originate from various transmitters, said method comprising providing the broadcast signals with information about at least the country of origin, the transmitting network, a unique service identification and a logical channel number, and said method being c h a r a c t e r i z e d in assigning in the receiver a
5 program location in a program location list to the received broadcast signal in accordance with assignment rules based on the received information about the country of origin, about the transmitting network, the unique service identification and the logical channel number.
- 10 2. Method according to claim 1, c h a r a c t e r i z e d in that a service corresponding to a received broadcast signal and identified by the unique service identifier is given a country preference by primarily assigning it to the program location in the program location list corresponding to the logical channel number and in case of conflict of logical channel numbers giving preference to any broadcast signal containing information of country
15 of origin corresponding to a predetermined indication of country preference.
3. Method according to claim 2, c h a r a c t e r i z e d in that any service not given country preference is placed in a group of services having consecutive program location numbers in the list of program location numbers, the program location numbers
20 being different from the respective logical channel numbers of the services.
4. Method according to claim 3, c h a r a c t e r i z e d in that services with the same country of origin are arranged together in subgroups within said group of services not given country preference.
- 25 5. Method according to claim any one of claims 2 to 4, c h a r a c t e r i z e d in that in case of conflict of logical channel numbers and country of origin preference is given to the signal with the highest signal strength.

6. Method according to any one of claims 2 to 4, characterized in that in case of conflict of logical channel numbers and country of origin regional preference is given to any broadcast signal containing information about the transmitting network corresponding to a predetermined indication of network preference.

5

7. Method according to claim 6, characterized in that any service not given regional preference is placed in a group of services having continuous program location numbers in the list of program location numbers, the program location numbers being different from respective logical channel numbers of the services.

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8. Method according claim 7, wherein the group of services given neither country preference nor regional preference are placed in subgroups of groups of services with the same country of origin.

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9. Method according to any preceding claim, characterized in that a map of which logical channel numbers are allocated to which program locations is stored.

10. Method according to claim 9, characterized in that a map of which transmitting network were previously associated with which program locations is stored.

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11. Receiver for digital broadcast signals, preferably digital terrestrial television signals, where the receiver has a plurality of program locations said receiver comprising means for extracting information about the country of origin of the signal, the transmitting network, a unique service identification and a logical channel number, characterized in that

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the receiver comprises initializing means for assigning the received signal to a program location in accordance with the extracted information and a set of assignment rules stored in the receiver.

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12. Receiver according to claim 11, characterized that said initializing means for assigning the service corresponding to a received signal to a program location primarily assigns the service to the program location in the program location list corresponding to the logical channel number and that in case of conflict of logical channel

numbers preference is secondarily given to any broadcast signal containing information of country of origin corresponding to a predetermined indication of country preference.

13. Receiver according to claim 12, c h a r a c t e r i z e d in that said
5 initializing means places any service not given country preference in a group of services having consecutive program location numbers in the list of program location numbers, the program location numbers being different from the respective logical channel numbers of the services.

10 14. Receiver according to claim 13, c h a r a c t e r i z e d in that the initializing means arranges services with the same country of origin are together in subgroups within said group of services not given country preference.

15 15. Receiver according to any one of claims 12 to 14, c h a r a c t e r i z e d in that in case of conflict of logical channel numbers and country of origin the initializing means gives preference to the signal with the highest signal strength.

16. Receiver according to any one of claim 12 to 14, c h a r a c t e r i z e d in that in case of conflict of logical channel numbers and country of origin the initializing
20 means gives preference to any broadcast signal containing information about the transmitting network corresponding to a predetermined indication of network preference.

17. Receiver according to claim 16, c h a r a c t e r i z e d in that the initializing means places any service not given regional preference in a group of services
25 having consecutive program location numbers in the list of program location numbers, the program location numbers being different from respective logical channel numbers of the services.

18. Receiver according to claim 17, c h a r a c t e r i z e d in that the
30 initializing means places the group of services given neither country preference nor regional preference in subgroups of groups of services with the same country of origin.

19. Receiver according to any preceding claim, characterized in that the receiver stores a map of which logical channel numbers are allocated to which program locations.

- 5 20. Receiver according to claim 19, characterized in that the receiver stores a map of which transmitting network were previously associated with which program locations.

ABSTRACT:

Method for assigning program locations in a receiver to individual received broadcast signals in accordance with predetermined assignment rules where the broadcast signals originate from various transmitters, said method comprising providing the broadcast signals with information about at least the country of origin, the transmitting network, a
5 unique service identification and a logical channel number, and said method being c h a r a c
t e r i z e d in assigning in the receiver a program location to the received broadcast signal in accordance with said assignment rules based on the received information about the country of origin, about the transmitting network, the unique service identification and the logical channel number.

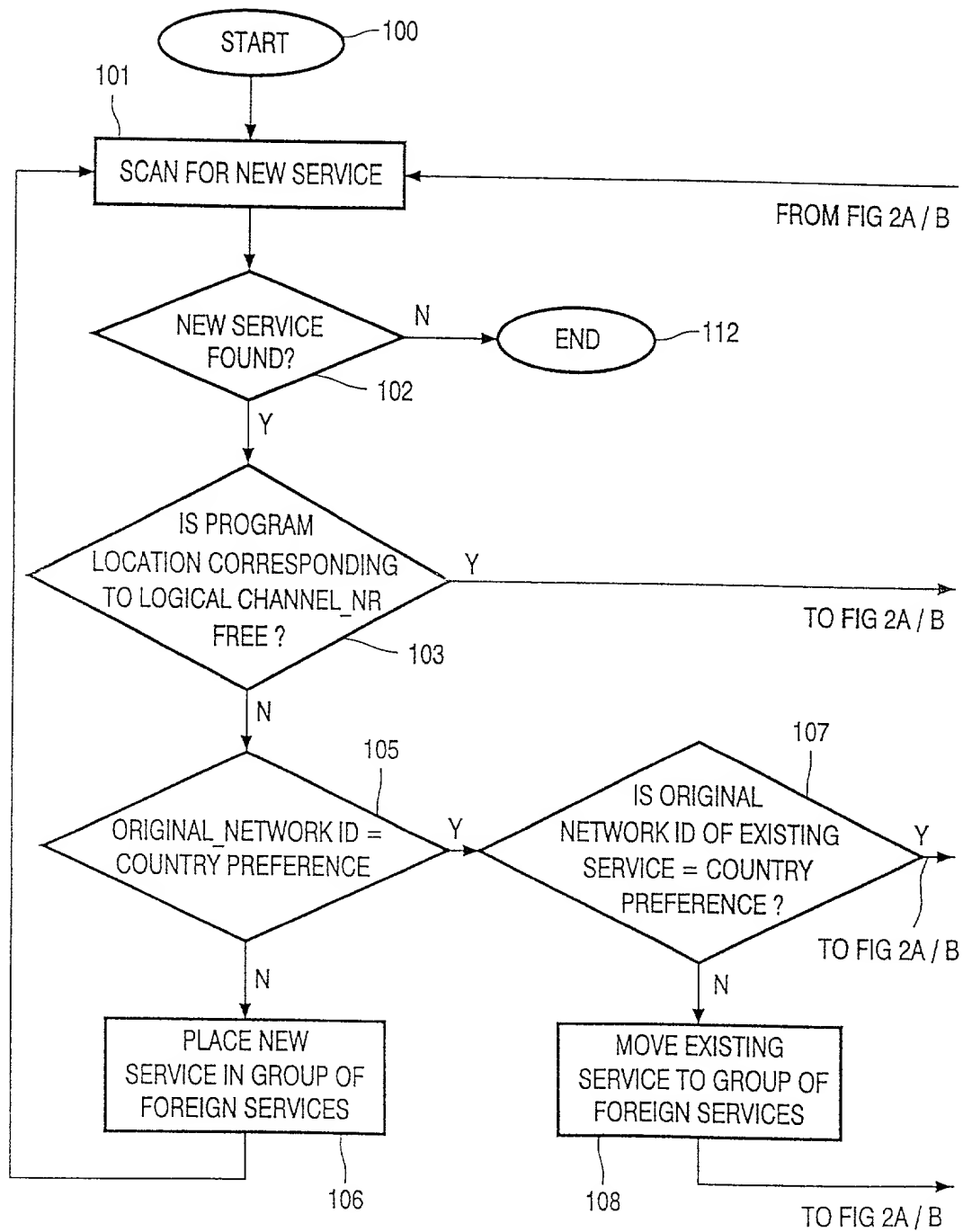
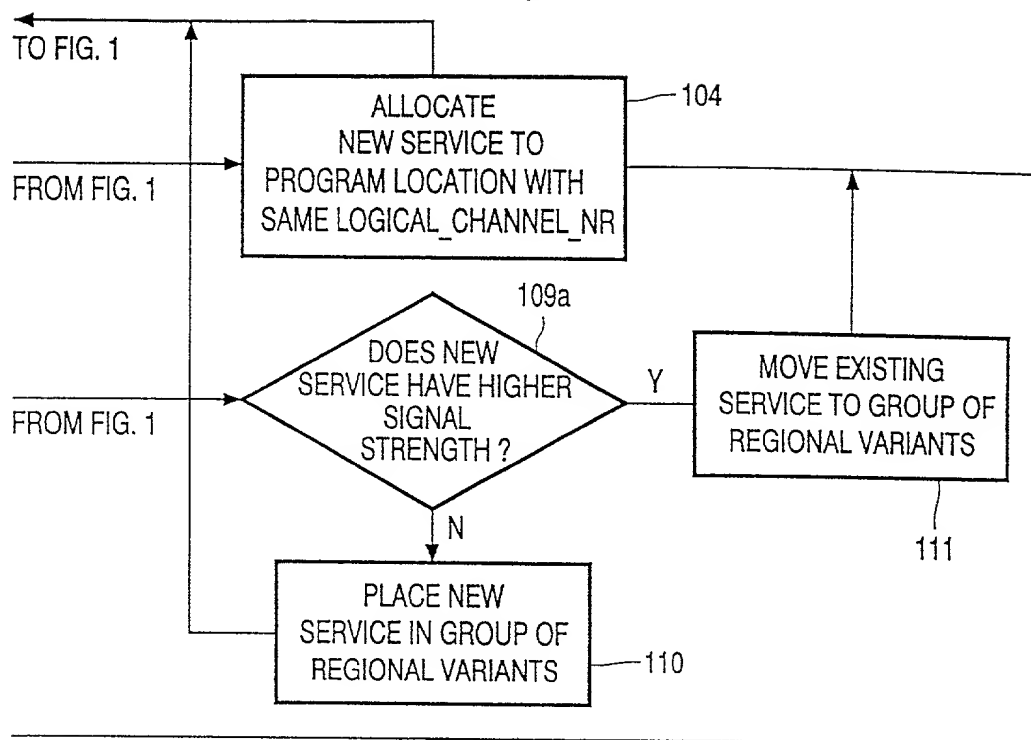


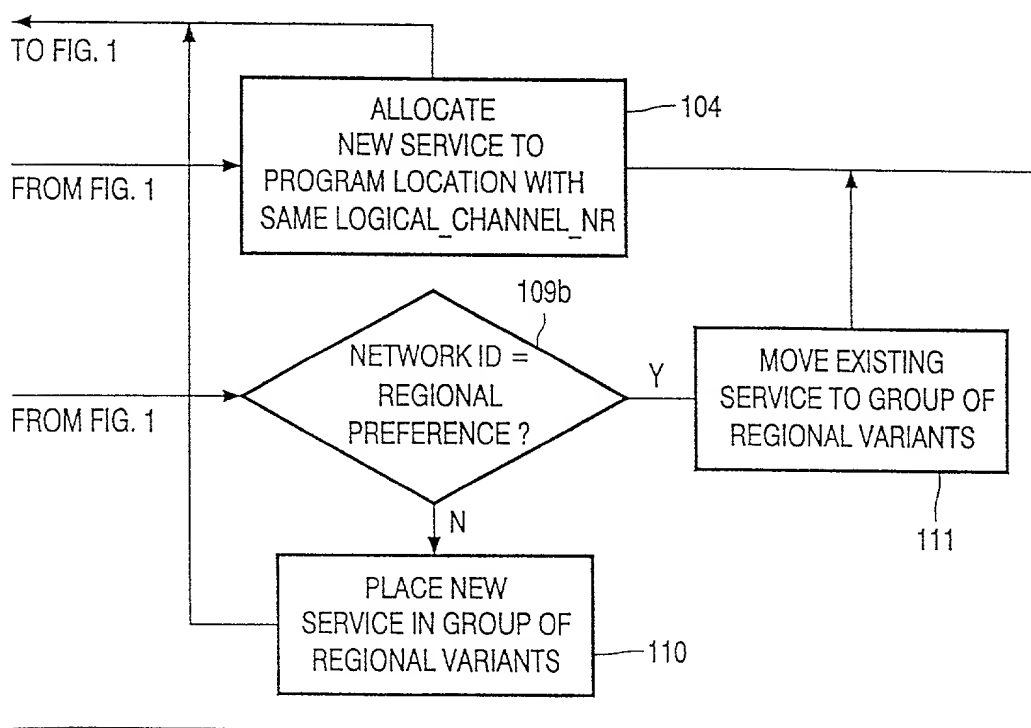
FIG. 1

2/3



FROM FIG. 1

FIG. 2A



FROM FIG. 1

FIG. 2B

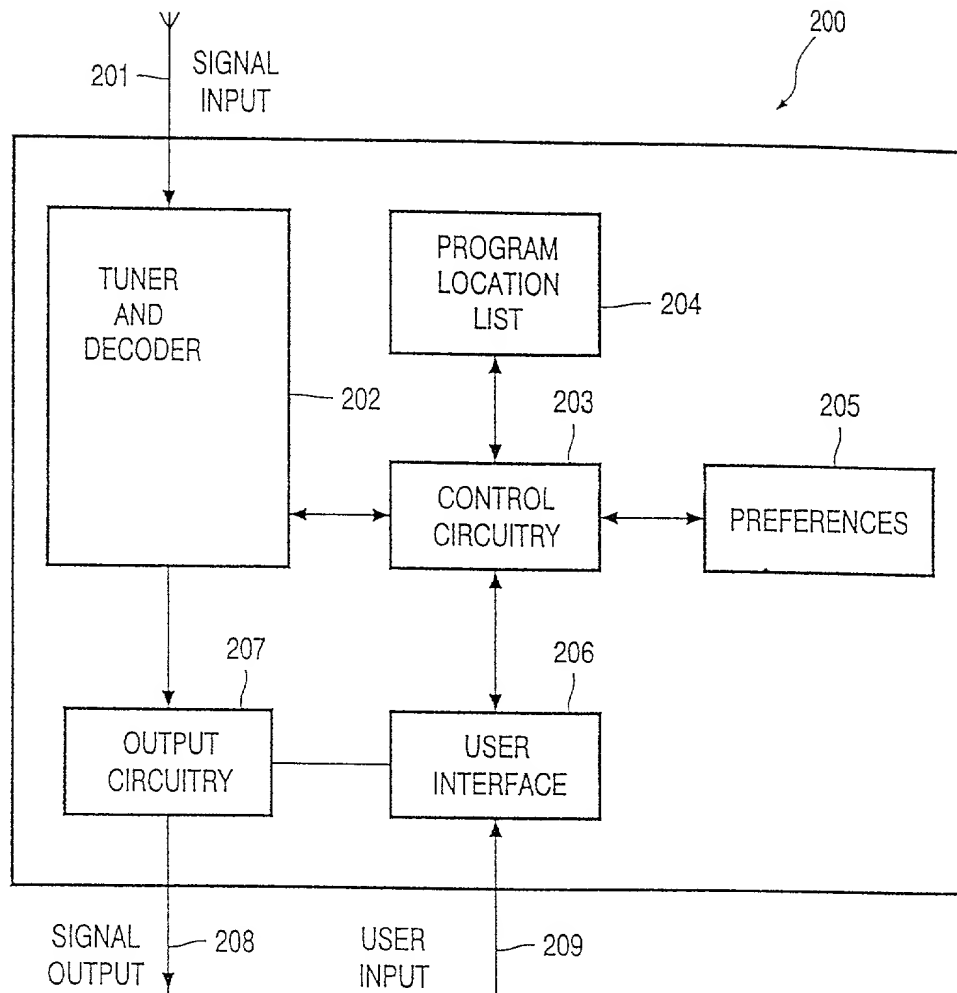


FIG. 3

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: **"Method for assigning program locations in a receiver"**
the specification of which (check only one item below):

☐ is attached hereto.

☐ was filed as United States application

Serial No _____

on _____

and was amended

on _____

☒ was filed as PCT international application

Number PCT/EP00/10280

on 13 October 2000

and was amended under PCT Article 19

on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:

COUNTRY	APPLICATION NUMBER	DATE OF FILING DAY, MONTH, YEAR	PRIORITY CLAIMED UNDER 35 USC 119
Europe	99203347.2	14 October 1999	YES

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (List name and registration number)


3

Jack E. Haken, Reg. No. 26,902
Michael E. Marion, Reg. 32,266
Edward M. Blocker, Reg. No. 30,245

Direct Telephone Calls to:
(name and telephone number)
(914)332-0222

201	FULL NAME OF INVENTOR	FAMILY NAME <u>VLOT</u>	FIRST GIVEN NAME <u>Marnix</u>	SECONDE GIVEN NAME <u>Claudius</u>
	RESIDENCE & CITIZENSHIP	CITY <u>Eindhoven</u>	STATE OR FOREIGN COUNTRY <u>The Netherlands</u> <u>NLX</u>	COUNTRY OF CITIZENSHIP <u>The Netherlands</u>
	POST OFFICE ADDRESS	POST OFFICE ADDRESS <u>Prof. Holstlaan 6</u>	CITY <u>5656 AA Eindhoven</u>	STATE & ZIP CODE/COUNTRY <u>The Netherlands</u>

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true: and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF INVENTOR 201


DATE 3rd May 2001